



Alzheimer's disease (AD) is a complex neurodegenerative disorder characterized by progressive memory loss and cognitive decline. It is the most common cause of dementia, affecting approximately 60-80% of elderly individuals. The pathogenesis of AD is multifactorial, involving genetic, environmental, and lifestyle factors. Key pathological features include the accumulation of amyloid-beta plaques and neurofibrillary tangles of tau protein in the brain. The amyloid precursor protein (APP) is a transmembrane protein that is cleaved into fragments, some of which are highly neurotoxic. The tau protein is a microtubule-associated protein that stabilizes the cytoskeleton and is essential for normal neuronal function. In AD, tau is hyperphosphorylated, leading to its aggregation and the formation of neurofibrillary tangles. The interaction between amyloid-beta and tau is thought to be central to the disease process. Research in this field has led to the development of various diagnostic and therapeutic approaches, including the use of biomarkers and targeted drug therapies. Understanding the underlying mechanisms of AD is crucial for the development of effective interventions to slow or prevent disease progression.

Central nervous system (CNS) involvement in Alzheimer's disease (AD) is a complex process. The amyloid precursor protein (APP) is a transmembrane protein that is cleaved into fragments, some of which are highly neurotoxic. The tau protein is a microtubule-associated protein that stabilizes the cytoskeleton and is essential for normal neuronal function. In AD, tau is hyperphosphorylated, leading to its aggregation and the formation of neurofibrillary tangles. The interaction between amyloid-beta and tau is thought to be central to the disease process. Research in this field has led to the development of various diagnostic and therapeutic approaches, including the use of biomarkers and targeted drug therapies. Understanding the underlying mechanisms of AD is crucial for the development of effective interventions to slow or prevent disease progression.

### Materials and Methods

Research on Alzheimer's disease (AD) involves a variety of methods, including clinical studies, genetic analysis, and neuroimaging. Clinical studies often focus on the relationship between cognitive function and biomarkers. Genetic analysis aims to identify risk factors and protective factors. Neuroimaging techniques, such as PET and MRI, are used to visualize brain structure and function. The use of animal models and cell-based assays is also common in AD research. These methods help to elucidate the underlying mechanisms of the disease and to evaluate potential therapeutic strategies.

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**Biological samples human brain tissue:** Plasma, CSF, AD, G, (CSF) CSF, F, I

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**Treatment Strategies:** ... AD  
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**Lifestyle interventions and risk reduction:** ...  
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